Listing of Claims

1.(CURRENTLY AMENDED) A system for sharing a cellular tower among multiple service providers comprising:

an antenna having an array of elements operable to define multiple, individual beams for signals of the at least two individual service providers in a common, analog RF communication frequency band;

converter circuitry to convert the antenna signals associated with the beams between the common RF communication frequency band and a common digital IF band representing the signals of the at least two service providers;

circuitry for duplicating the common digital IF band;

digital filtering circuitry for processing the duplicated digital IF band and defining individual portions of the respective duplicated digital IF bands, such that a separate band portion is defined for signals of each of the at least two individual service providers;

signal processing circuitry for each of the at least two service providers, the signal processing circuitry operable to process channel signals associated with the individual digital IF band portions defined for the individual service providers and to simultaneously drive the antenna to define at least one individual beam for each individual service provider.

2.(CURRENTLY AMENDED) The system of claim 1 wherein the converter circuitry includes frequency converter circuitry to convert the antenna signals between the frequencies of the common, analog RF communication frequency band and common intermediate frequencies for the band; and

digital converter circuitry to convert the signals between the intermediate frequencies and a common digital IF band.

3.(ORIGINAL) The system of claim 1 wherein the signal processing circuitry defines multiple individual beams for each individual service provider.

4.(CANCELED)

5.(ORIGINAL) The system of claim 1 wherein said antenna comprises an array of elements arranged in columns of multiple elements, the signal processing circuitry defining the individual beams by individually controlling each of the columns of the array.

6.(ORIGINAL) The system of claim 1 wherein the signal processing circuitry defines the individual beams by individually controlling each element of the array.

7.(ORIGINAL) The system of claim 1 wherein the signal processing circuitry defines the individual beams simultaneously.

8.(ORIGINAL) The system of claim 1 wherein individual beams are oriented indifferent directions.

9.(ORIGINAL) The system of claim 2 further comprising fiber converters coupled between the digital converter circuit and the signal processing circuitry to optically pass the signals therebetween.

10.(CURRENTLY AMENDED) The system of claim 1 wherein the converter circuitry divides the analog RF communication frequency band into multiple analog RF band portions for conversion.

11.(ORIGINAL) The system of claim 2 wherein the frequency converter circuit divides the communication frequency band into multiple bands for conversion and the digital converter circuit individually converts each of the multiple bands.

12.(ORIGINAL) The system of claim 1 wherein the antenna array of elements is operable to define multiple, individual beams for signals in a plurality of communication frequency bands.

13.(ORIGINAL) The system of claim 12 further comprising a frequency multiplexor coupled between the antenna and the converter circuitry to provide transmit and receive signals for each of the plurality of communication frequency bands for individual conversion.

14.(ORIGINAL) The system of claim 1 wherein the signal processing circuitry is further operable to selectively drive the antenna to steer at least one of the defined beams.

15.(ORIGINAL) The system of claim 14 wherein the beam is steered in at least one of azimuth and elevation.

16.(CURRENTLY AMENDED) A cellular ~~RF link~~ system for accommodating multiple service providers comprising:

a tower defining a plurality of sectors;

a plurality of sector antennas positioned proximate the top of the tower, each sector antenna oriented to face a sector and having an array of elements operable to define multiple, individual beams in that sector for signals of at least two individual service providers in a common, analog RF communication frequency band;

converter circuitry to convert the antenna signals of the sector antennas between the common RF communication frequency band and a common digital IF band;

circuitry for duplicating the digital IF band;

digital filtering circuitry for processing the duplicated digital IF bands and defining individual portions of the respective duplicated digital IF bands for a sector, such that a separate band portion is defined for signals of each of the at least two individual service providers in the sector;

signal processing circuitry for each of the at least two service providers, the signal processing circuitry operable to process signals associated with the individual digital IF band portions defined for the individual service providers in the sectors and to simultaneously drive the antenna to define at least one individual beam in each sector for each individual service provider in that sector.

17.(ORIGINAL) The system of claim 16 wherein the signal processing circuitry is further operable to define multiple individual beams in each sector for each individual service provider in that sector.

18.(ORIGINAL) The system of claim 16 wherein at least one sector antenna comprises an array of elements arranged in columns of multiple elements, the signal processing circuitry operable to define the individual beams in that sector by individually controlling each of the columns of the array.

19.(ORIGINAL) The system of claim 16 wherein the signal processing circuitry is operable to define the individual beams in that sector by individually controlling each element of the array.

20.(ORIGINAL) The system of claim 16 wherein said signal processing circuitry defines the individual beams simultaneously.

21.(ORIGINAL) The system of claim 16 wherein individual beams are oriented in different directions.

22.(ORIGINAL) The system of claim 16 wherein the antenna array of elements is operable to define multiple, individual beams in a sector for signals in a plurality of communication frequency bands.

23.(ORIGINAL) The system of claim 16 wherein the signal processing circuitry is further operable to selectively drive the antenna to steer at least one of the defined beams in a sector.

24.(ORIGINAL) The system of claim 23 wherein the beam is steered in at least one of azimuth and elevation.

25-33.(CANCELED)

34.(CURRENTLY AMENDED) A method for sharing a cellular tower among multiple service providers comprising:

generating at least one individual beam for a first service provider in a first band portion and for use through an antenna having an array of elements operable to define multiple, individual beams for signals in at least one analog RF communication frequency band;

generating at least one other individual beam for a second service provider in a second band portion of the analog RF communication frequency band and for use through said antenna;

converting the antenna signals associated with the beams between the RF communication frequency band and a digital IF band representing the signals of the first and second service providers;

digital filtering the digital IF band to define individual portions of the digital IF band such that a separate band portion is defined for the first and second service providers; and

digital signal processing the signals associated with the separate digital IF band portions for the first and second service providers and driving the antenna to define individual beams of the first and second service providers.

35.(ORIGINAL) The method of claim 34 further comprising generating multiple individual beams for each individual service provider.

36.(ORIGINAL) The method of claim 34 wherein the antenna comprises an array of elements arranged in columns of multiple elements, the method further comprising individually controlling each of the columns of the array to generate the individual beams.

37.(ORIGINAL) The method of claim 34 further comprising individually controlling each element of the array to generate the individual beams.

38.(ORIGINAL) The method of claim 34 further comprising generating the individual beams simultaneously.

39.(CURRENTLY AMENDED) The method of claim 34 wherein the antenna is operable to define beams in multiple analog RF communication frequency bands and the method further comprises:

generating, for each of the analog RF communication frequency bands, an individual beam for each service provider in a corresponding band portion of the RF communication frequency band.

40.(ORIGINAL) The method of claim 34 further comprising steering at least one of the individual beams.

41.(ORIGINAL) The method of claim 40 further comprising steering in at least one of azimuth and elevation.

42.(CANCELED)

43.(CURRENTLY AMENDED) The method of claim 34 wherein said RF communication frequency band includes one of an RF link frequency band and a microwave backhaul frequency band.

44-54.(CANCELED)

55.(CURRENTLY AMENDED) A cellular tower shared among multiple service providers comprising:

an antenna positioned proximate the top of the tower and having an array of elements operable to define multiple, individual beams for signals of at least two individual service providers in ~~a~~ an analog RF communication frequency band;

converter circuitry to define a digital IF band from the analog RF communication frequency band and circuitry to duplicate the digital IF band;

signal processing circuitry for each of the at least two service providers, the signal processing circuitry operable to process the digital IF band and define individual

digital IF band portions corresponding to the service providers and to process signals of the service providers associated with such digital IF band portions and simultaneously drive the antenna to define at least one individual beam for each individual service provider.